

REMARKS

Claims 1-23 are presented for examination. An Advisory Action was issued on July 14, 2004, ("the Advisory Action") which refused to enter the amendments filed by applicants on June 22, 2004. Applicant filed a Request for Continued Examination on July 23, 2004, and requested that the Amendment filed on June 22, 2004, be entered and considered. Accordingly, this preliminary amendment is being filed with the understanding that applicant's Amendment filed June 22, 2004, is entered and made of record.

This preliminary amendment revises independent claims 1, 10, 19, and 23 to delete the term "separate" and replace it with "different," and amends claim 9 to correct a typographical error. This amendment is made in response to the Examiner's statements in the Advisory Action that the previous amendments raise a new matter issue. Specifically, the Examiner stated that the previous amendment "indicates that the reinforcing agent and ion-exchange polymer are not in direct contact" (Advisory Action, page 2). This is not what applicant intended. Rather, the amendment was made to be consistent with applicant's previous arguments, and to clarify that the reinforcing agent and ion-exchange polymer are different (i.e., separate) materials (which the Advisory Action admits is fully supported by the specification and claims). This preliminary amendment simply replaces "separate" with "different" to clarify the claimed invention. Support for the preliminary amendment can be found in the original claims by virtue of claiming an ion-exchange polymer and a reinforcing agent using the conjunction "and," thereby indicating two different (i.e., separate) materials. Applicant respectfully requests entry of the amendments, and reconsideration of claims 1-23.

Claims 1-3, 6-12 and 15-23 were rejected in the under 35 U.S.C. § 102 (b) as being anticipated by Bahar *et al.*, U.S. Patent No. 5,635,041 ("Bahar"). Applicant respectfully traverses this rejection.

Applicant's invention as recited in claim 1 is directed to a reinforced composite ionic conductive polymer membrane which has improved ionic conductivity, improved moisture retention, and reduced cross over of liquid fuel by the addition of a reinforcing agent that in turn improves the overall efficiency of the fuel cell. Applicant's reinforced composite ionic conductive polymer membrane comprises: a porous support; an ion exchange polymer that impregnates the porous support; *and* a reinforcing agent that impregnates the porous support. The reinforcing agent is at least one selected from the group consisting of a moisture retentive material and a catalyst for facilitating oxidation of hydrogen. Bahar fails to disclose

a reinforcing agent that is different (i.e., separate) and distinct from the ion exchange polymer, but rather discloses an ion exchange polymer that may or may not include additives. The examples of the present specification illustrate the superior results achieved when a reinforcing agent is used together with a different (i.e., separate) ion-exchange polymer. Indeed, applicant's comparative examples are similar to the preferred embodiments disclosed in Bahar, and in the other prior art documents cited in the rejections discussed below.

Even if Bahar discloses that the ion exchange polymer is embedded into a porous support base such as polytetrafluoroethylene, Bahar fails to specifically teach the addition of a "reinforcing agent" in addition to the ion-exchange polymer. Rather, Bahar discloses powders and other complementary materials that are incorporated into the ion-exchange polymer. Because these materials are incorporated into the ion-exchange polymer, they are not believed to be available as a reactant to reinforce the membrane and provide moisture-retentive effects. Thus, Bahar fails to disclose or suggest a reinforcing agent selected from the group consisting of a moisture retentive material and a catalyst for facilitating oxidation of hydrogen in addition to the ion-exchange polymer. Bahar therefore fails to disclose all of the features recited by the presently claimed invention, and accordingly, applicant respectfully submits that claim 1 and its dependent claims are distinguished and allowable over Bahar.

Claims 1, 2, 5-11 and 14-23 also were rejected under 35 U.S.C. § 102 (b) as being anticipated by Grot *et al.*, U.S. Patent No. 5,919,583 ("Grot"). Applicant respectfully traverses this rejection.

Grot discloses cation exchange polymer membranes having cation exchange groups and inorganic fillers dispersed therein that exhibit reduced fuel crossover. The inorganic filler groups are selected from a group consisting of titanium dioxide, tin and hydrogen mordenite, oxides and phosphates of zirconium, and mixtures thereof. Like Bahar, Grot fails to disclose the use of a reinforcing agent in addition to the ion-exchange polymer. Rather, these documents merely describe conventional fillers and additives incorporated into polymers. Incorporating these fillers and additives into the ion-exchange polymer is not the same as adding a reinforcing agent as a different (i.e., separate) component of the composite ionic conductive polymer membrane. This feature is borne out in the examples in the present specification where it is shown that separately added reinforcing agents provide superior properties. Accordingly, it is respectfully submitted that Grot does not disclose all of the features recited in the present claims. Accordingly, applicant respectfully submits that

claims 1, 2, 5-11 and 14-23 are distinguished and allowable over Grot. Applicant respectfully requests that the Examiner reconsider and withdraw this rejection.

Despite applicant's previous arguments, the Examiner still contends that Bahar and Grot anticipate the present claims. The Examiner states in the Advisory Action that "[i]t is unclear what Applicant is attempting to argue. The examples in the present specification teach the ion exchange polymer and the reinforcing agent are mixed thoroughly to obtain a reinforced slurry. Thus, the reinforcing agent is incorporated into the polymer because they are 'mixed thoroughly.'" Applicant respectfully disagrees with the Examiner in this regard.

As correctly noted by the Examiner, the reinforcing agent and ion exchange polymer are mixed thoroughly, but that does not mean that the reinforcing agent becomes incorporated into the polymer. Indeed, the Examiner also correctly notes that the mixture is a *slurry*. The slurry is a mixture of the two components as separate and different components — the reinforcing agent does not become part of the polymer like the additives disclosed in the prior art. As stated in previous responses, this distinct feature of the present invention renders it quite different from the teachings of the prior art. Because the additive materials disclosed in Bahar and Grot are incorporated into the ion-exchange polymer, they are not believed to be available as a reactant to reinforce the membrane and provide moisture-retentive effects. The present invention as claimed which comprises a reinforcing agent that is different (i.e., separate) and distinct from an ion-exchange polymer, provides a superior membrane because the reinforcing agent is available as a reactant to provide moisture-retentive effects. This is neither suggested nor taught by the cited prior art. Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection.

Claims 1-4, 8, 10-13, 17 and 19 also were rejected under 35 U.S.C. §103 (a) as being unpatentable over Watanabe *et al.*, US Patent No. 5,766, 787 (Watanabe) in view of Grot. Applicant respectfully traverses this rejection.

Even if the teachings of these two references were combined as suggested in the Action, the combination still would not result in the presently claimed invention. Rather, the combination would result in, at best, an ion-exchange polymer containing conventional additives and fillers, and a porous support. No additional reinforcing agent is disclosed or suggested by the cited art. Indeed, the prior art cited in the Action teaches directly away from adding the reinforcing agent as a different (i.e., separate) component by disclosing the addition of certain fillers and additives into the ion-exchange polymer which necessarily

become a part of the polymer, instead of being different (i.e., separate) from the polymer. As stated above, incorporating additives and fillers into an ion-exchange polymer is not the same as adding a different (i.e., separate) reinforcing agent that separately impregnates the porous support. The combination of Watanabe and Grot therefore fail to render obvious the present claims, and Applicant respectfully requests that the Examiner reconsider and withdraw this rejection.

In view of the amendments and remarks submitted herewith, applicant respectfully submits that claims 1-23 are in condition for allowance, and a Notice of Allowance indicating as such is earnestly solicited. In the event that any issues remain outstanding, applicant would appreciate the courtesy of a telephone call to the undersigned counsel to resolve such issues in an expeditious manner and place the application in condition for allowance.

Respectfully submitted,

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